

Claims

1. A method for electrodeposition of bronzes, with which the substrate to be coated is plated in an acid electrolyte that contains at least tin and copper ions, and alkylsulfonic acid and a wetting agent,

which is characterized by the fact that

an aromatic nonionic wetting agent is added to the electrolyte, which has a concentration of free methanesulfonic acid of at least 290 g/L and layers with a copper content of at least 10%, preferably at least 60%, are deposited from it.

2. A method as in Claim 1, which is characterized by the fact that 2 to 40 g/L of the aromatic, nonionic wetting agent are added to the electrolyte.

3. A method as in Claim 1 or 2, which is characterized by the fact that that β -naphthol ethoxylate and/or nonylphenol ethoxylate is added to the electrolyte as aromatic nonionic wetting agent.

4. A method as in one of Claims 1-3, which is characterized by the fact that tin or copper ions are added to the electrolyte in the form of a soluble salt, preferably as the salt of an alkylsulfonic acid, preferably as methanesulfonate.

5. A method as in one of Claims 1-4, which is characterized by the fact that 2-75 g/L tin ions are added to the electrolyte.

6. A method as in one of Claims 1-5, which is characterized by the fact that 5-195 g/L tin methanesulfonate are added to the electrolyte.

7. A method as in one of Claims 1-6, which is characterized by the fact that 2-70 g/L copper ions are added to the electrolyte.

8. A method as in one of Claims 1-7, which is characterized by the fact that 8-180 g/L copper methanesulfonate are added to the electrolyte.

9. A method as in one of Claims 1-8, which is characterized by the fact that the deposition takes place at a temperature of 17-25°C.

10. A method as in one of Claims 1-9, which is characterized by the fact that the deposition takes place in a current density range of 0.1-120 A/dm².

11. A method as in one of Claims 1-10, which is characterized by the fact that the deposition takes place in a highly acid medium.

12. A method as in one of Claims 1-11, which is characterized by the fact that the deposition takes place in a pH range <1.

13. An electrolyte for electrodeposition of bronzes containing at least tin and copper ions, and alkylsulfonic acid and a wetting agent,

which is characterized by the fact that

the electrolyte contains an aromatic nonionic wetting agent and has a concentration of free methanesulfonic acid of at least 290 g/L and layers with a copper content of at least 10%, preferably at least 60%, are deposited from it.

14. An electrolyte as in Claim 13, which is characterized by the fact that it contains 2-40 g/L of the aromatic nonionic wetting agent.

15. An electrolyte as in one of Claims 13-14, which is characterized by the fact that β-naphthol ethoxylate and/or nonylphenol ethoxylate is used as aromatic nonionic wetting agent.

16. An electrolyte as in one of Claims 13-15, which is characterized by the fact that it contains tin and copper ions in the form of a soluble salt, preferably as the salt of an alkylsulfonic acid, especially preferably as methanesulfonate.

17. An electrolyte as in one of Claims 13 and 16, which is characterized by the fact that it contains 2-75 g/L tin ions.

18. An electrolyte as in one of Claims 13 and 17, which is characterized by the fact that it contains 5-195 g/L tin methanesulfonate.

19. An electrolyte as in one of Claims 13 and 18, which is characterized by the fact that it contains 2-70 g/L copper ions.

20. An electrolyte as in one of Claims 13 and 19, which is characterized by the fact that it contains 8-280 g/L copper methanesulfonate.

21. An electrolyte as in one of Claims 13-20, which is characterized by the fact that it contains polyethylene glycol and/or anionic surfactants as wetting agents.

22. An electrolyte as in one of Claims 13-21, which is characterized by the fact that it contains bismuth and/or zinc.

23. An electrolyte as in one of Claims 13-22, which is characterized by the fact that it contains a chloride.

24. An electrolyte as in one of Claims 13-23, which is characterized by the fact that it contains a gluconate as complexing agent.

25. An electrolyte as in one of Claims 13-24, which is characterized by the fact that it contains an oxidation inhibitor from the class of the dihydroxybenzenes.

26. An electrolyte as in one of Claims 13-25, which is characterized by the fact that it contains brighteners from the class of the aromatic carbonyl compounds and/or α,β-unsaturated carbonyl compounds.

27. An electrolyte as in one of Claims 13-26, which is characterized by the fact that it has a pH value <1.

28. An electrolyte as in one of Claims 13-27 containing

2-75 g/L divalent tin

2-70 g/L divalent copper

2-4 g/L an aromatic nonionic wetting agent,
0-50 g/L a stabilizer and/or complexing agent,
0-10 g/L of an anionic and/or nonionic aliphatic wetting agent,
0-5 g/L an oxidation inhibitor,
0-5 g/L a brightener,
0-5 g/L trivalent bismuth,
0-25 g/L divalent zinc,
at least 140 g/L of an alkylsulfonic acid.

29. A bronze coating prepared by a method for electrodeposition, in particular by a method as in one of Claims 1-10, which is characterized by the fact that it has a copper content >10%, preferably >60%.